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ABSTRACT

The equity and effectiveness of the student financial aid system are considered, as it applies to undergraduates attending public institutions. In addition to evaluating whether aid is targeted to students with the greatest financial needs, attention is directed to the relationship between the receipt of different types of financial aid and dropout rates. One data source is cross-sectional data on 10,200 randomly selected records of aid recipients (weighted to represent national totals) from a sample of public colleges and universities. Information is provided on average awards to students in three need categories for various types of federal, state, and institutional awards. The analysis is supplemented by data on nonaided students from four state-based student surveys of resources and expenditures (i.e., Arizona, California, New York, and Wisconsin). Longitudinal data on a random sample of University of Wisconsin System freshmen provides information on aid utilization during the first 3 years of undergraduate study (1979-1981). The following categories of aid are assessed: grants only, loans only, work-study only, grants and loans, grants and work-study, loans and work-study, and all three. The distribution of the various types of need-based aid to dependent and independent students and to students in four income groups is also considered. (SW)

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For policymakers, student financial aid administrators, and voters, there are two fundamental standards by which the student financial aid system might be judged:

> That the aid is successfully targeted to those whose financial needs are greatest.
>
> That the aid promotes the effectiveness of the educational process by increasing the success of aid recipients.

The first standard is straightforward, at least conceptually. The second is less so because it depends on the definition of effectiveness. A system is effective to the extent that it stimulates its recipients to do "better" than they would have without it. But what <u>better</u> means depends, of course, on the goals that are set for the system. Better can mean that greater proportions of the targeted groups enroll than would have without the aid. It can mean that lower proportions of enrollees drop out along the way (or, alternatively, that higher proportions persist). And it can mean that higher proportions of the targeted groups graduate than would have without it. The first standard is synonymous with equity. But it also affects the second in that it is the mechanism by which effectiveness is achieved.[1]

This paper examines the record for undergraduate education with respect to both standards. The research reported here should be regarded as a pilot study because the data are limited to students attending public colleges and universities. Efforts are underway to extend the analysis to private colleges and universities and proprietary institutions as well.

Background

Considerable efforts have been made since the 1960s to develop an equitable and effective student financial aid system at the legislative, administrative, and analytic level.

First, there have been repeated efforts involving government officials, legislators, analysts, and student aid practitioners aimed at developing guidelines for the targeting and packaging of student aid (Cartter, 1971; Higher Education Amendments of 1972; National Task Force on Student Aid Problems, 1975; Carnegie Council on Policy Studies in Higher Education, 1979; National Association of College and University Business Officers, 1981). Important examples of this kind of activity include the decision to employ the Pell Grant program (formerly the Basic Education Opportunity Grant) as a "floor" of support for the packaging of aid.[2] The purpose was to enable those with the greatest need to receive substantial proportions of their aid in the form of nonrepayable grants, with less needy students able to draw upon repayable loans.

Second, a large volume of material has been written (roughly 2,000 articles), for the most part by student aid officers, on ways to better organize and deliver student aid (Fenske and Huff, 1983; Davis and Van Dusen, 1978). These typically include studies on needs analysis systems such as the Pell and Uniform Methodology for determining the eligibility of students facing a wide variety of circumstances and problems as well as studies on how to adjust to changing programs and regulations, operate student aid offices, and train staff.

The major obstacles are the following. First, available data do not describe the operation of the student aid system as a whole. Individual student aid programs are separately administered by different government units, making it difficult to obtain data representing the entire financial aid system, even at the federal level (Finn, 1978).

Second, limitations in standard approaches to analysis exacerbate the problem. For example, an approach frequently used by economists employs

logical argument and limited evidence to judge whether the distribution and use of student aid is better or worse in terms of equity and efficiency criteria. This approach is rigorous, is associated with theory, and adapts well to the lack of data on the student aid system; yet it often neglects broader considerations of promoting societal goals.

Empirical research into the effects of financial aid on student behaviors suffers from a contrasting set of weaknesses. This approach often focuses on relationships between goals and effects, but as studies by Hansen and Lampman (1974) and Astin (1975) have noted, student aid programs frequently have a variety of goals, some explicit and others not, thereby making it difficult to link goals with effects. Second, research on the behavior of recipients is largely unassociated with any kind of theory. Few theories of college-going behavior have evolved. This makes it difficult to establish alternative evaluation standards. The only topic to evolve a predictive theory is attrition (or dropout behavior); but even here linkages have yet to be made with student aid and other finance-related variables (Tinto, 1982).

In addition to the lack of theory, empirical approaches have limitations. A key comparison group--namely nonaided students--is all but absent from analyzed data (Astin, 1975; Iwai and Churchill, 1982; Sutton, 1977; Vorhees, 1985). Studies on several effectiveness related topics including attrition, persistence and degree attainment are often limited to single institutions, thus raising questions about whether the findings can be generalized to other institutions in other settings (Iwai and Churchill, 1982; Jensen, 1984; Odutula, 1983; Sutton, 1977; Vorhees, 1985). Efforts to compile comprehensive data are also either severely limited in scope (Astin 1975) or sporadic and therefore quickly obsolete (Sewell, 1957; Project Talent, 1960; National

Longitudinal Study of the High School Class of 1972, High School and Beyond, 1980).

These empirical and analytic problems make it difficult for advocates and critics alike to support their judgments about the system with unambiguous evidence, leading to interminable debate over what are basically unanswerable questions.

Ideally, data for evaluating the equity and effectiveness of the student aid system would be longitudinal, statistically sampled, and designed to provide detailed information about potential as well as present and past students in all types of postsecondary institutions. Also included would be variables associated with well-tested theories of relevant student behaviors.

The study reported here combines elements of the two previously mentioned standard approaches to analysis and attempts to capture some of the features of an "ideal" data base by piecing together three new or previously under-utilized large-scale and highly detailed data sources: a student aid recipient data base representing public colleges and universities, four state-based surveys of student resources and expenditures, and a longitudinal data base that follows the freshman class of the institutions belonging to a statewide public university system through three years of undergraduate education. Although limited to students already attending public colleges and universities--thereby excluding the possibility of analyzing the effects of student aid on total enrollment--these data sources provide detailed cross-sectional and longitudinal information about aided and nonaided students and a large number of student aid programs.

Before we proceed to our empirical analysis, let us review what we know and do not know about the extent to which the two criteria stated at the beginning of the paper are being achieved.

What We Know and Do Not Know About the Equity and Effectiveness of Student Aid

What do we know about targeting? We know, as mentioned earlier, that legislators, study commissions, higher education associations, and government agencies have developed guidelines for the targeting of student aid programs. Efforts to develop them were complicated by program changes in response to debates over purpose (e.g., facilitating choice between public and private colleges, retention, recruitment, unusual financial circumstances, satisfactory progress, dependent and independent students). But, for the most part, the focus has been on bringing order and some measure of vertical equity to the system.

We also know, from various divisions in the U.S. Department of Education and several other federal departments, about program costs and numbers and characteristics of aided students. The annual program reviews indicate considerable variation in the extent to which they target aid on low income students. This is true even among recipients of various grant programs.

We have only the vaguest sense of income and other differences between aid recipients and nonrecipients. Neither do we know much about differences among groups of aid recipients themselves--beyond the obvious fact that most aid recipients receive aid on the basis of income-related needs tests and that some receive only categorically defined aid such as scholarships or veterans benefits. Another unknown is how, and even more important how effectively, student aid is packaged (i.e., the extent and types of multiple recipiency). Many students are known to receive only Pell Grants or only GSL loans, but little is known about patterns in the packaging of aid either for a single time period or over time.

Given program objectives and what we do know about program targeting, what should we expect to find in a study of the equity characteristics of student aid? Long-standing efforts to develop and perfect guidelines, the evolution of income-based needs analysis systems, and the establishment of Pell grants as a foundation of support for needy students suggest that at least those students receiving aid on the basis of demonstrated need should represent lower income backgrounds than nonaided students. Second, we should expect that students receiving aid based on the more stringent Pell and Uniform Methodology needs analysis systems would come from lower income families than those who qualify under the less stringent GSL system. Third, we should not expect students who receive aid that is not based on demonstrated need to have different family income levels from nonaided students.

What do we know about effectiveness, however measured? With respect to enrollment behavior the picture is unclear. Jackson (1978, 1980) found long-term benefits to be possible, but he was less certain about the likelihood of short-term effects because of the large number of environmental variables that influence enrollments. Hansen (1983) found little or no evidence that financial aid had increased the participation rate of lower relative to higher income students.

With respect to degree attainment, the situation is little better (Jensen, 1984). The one study that focused on this measure of effectiveness found that recipients of aid had slightly higher degree completion rates than nonaided students, but the study was not definitive because it represented only a single institution.

Studies on the closely related topics of persistence, retention, and attrition are relatively consistent in their findings that at least some forms of student aid have a beneficial effect. For example, three studies (Astin,

1975; H. Astin and Cross, 1979; and Odutula, 1983) found that grants and work-study awards had positive effects but that loans had negative effects, especially when directed at low income and minority students. Another study (Vorhees, 1985) found positive effects from all forms of aid including loans. Four others (Iwai and Churchill, 1982; Jensen, 1984; Sutton, 1977; and Terkla, 1984) found beneficial effects for various outcome measures from student aid in general. Unfortunately, none of this research can be generalized to predict the effects of the student aid system as it now operates. Five of the eight studies cited were restricted to single institutions (Iwai and Churchill, 1982; Jensen, 1984; Odutula, 1983; Sutton, 1977; Vorhees, 1985). Three use data that predated the major expansions in student aid programs (Astin, 1975; Jensen, 1984; Terkla, 1984). Furthermore, none of these studies except Jensen's compare aided and nonaided students. Thus, we do not know whether attrition rates for need-based aid recipients differ from those for students not receiving aid or, for that matter, for students receiving nonneed-based or categorical aid. Second, we do not know whether students who are classified as need-based or nonneed-based recipients or as nonaided students retain the same classifications over time. We also lack similar knowledge about stability in the receipt of specific forms and combinations of aid from year to year. Finally, and perhaps most important, we do not know whether combinations of various forms of aid (i.e., aid packages) affect students differently than do individual forms of aid.

We do know, from the extensive literature on the determinants of attrition from college, that many factors play an important role (Pentages and Creedon, 1978; Tinto, 1975). We also know that, except during wars, attrition rates have remained virtually unchanged for over a century. Now, as in 1885, roughly 45 percent of entering students drop out during the first four undergraduate years (Tinto, 1982).

Prior to the expansion of the student aid system, associations were frequently found between attrition and the socio-economic and income status of the family (Iffert, 1957; Summerskill, 1962; Eckland, 1965; Tinto, 1975). Children from lower status families were found to exhibit higher attrition rates than children from higher status families, even when intelligence was taken into account (Sewell and Shah, 1967). During the past twenty years, however, this association has become weaker to nonexistent (Morrisey, 1971). Since this is the period over which the student financial aid program expanded massively, it is at least plausible that financial aid may have played some role.

This review of what is known about student aid and attrition does not give us much clear guidance about what we should expect to find from an examination of recent data on student aid and attrition rates. However, we know that many variables affect attrition, and we can infer from the great stability over time that attrition rates are difficult to change. Also, need-based student aid is directed at only one problem, namely the family or individual's ability to pay (i.e., economic disadvantage). Since this variable in the past was frequently associated with high attrition rates, the combination of these factors suggests that a finding that attrition for need-based aid recipients is similar to attrition for nonaided students would be evidence that student aid had a favorable impact.

Tinto (1982) seems to suggest this standard:

> There is very little one can do at the national level to substantially reduce dropout from higher education without altering the character of that education. Of course we can and should act to reduce dropout among certain subgroups of the population where evidence supports the claim that those groups are being unjustly constrained from completion of higher education.

Because economic disadvantages are difficult to overcome within a short period of time, we also expect considerable stability in aid recipient status

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over time. Finally, the results of prior research on the effects of various forms of aid on attrition would lead us to expect aid in the form of grants and work study, other things being equal, to be associated with lower attrition rates than loans. But other things may not be equal, since the prior research findings plus the intended use of Pell grants may have led student aid officers to direct loan funds rather than grant funds to higher income students. If this proves to be the case we would expect attrition rates for loan recipients to be similar to those for recipients of grants and work-study awards.

Data and Methodology

This study employs both cross-sectional and longitudinal data. The former allow us to examine aid distribution patterns within the student aid system. The latter allow us to follow students through time to see how they move from one form of aid or aid package to another.

The cross-sectional data base consists of 10,200 randomly selected student aid recipient records (weighted to represent national totals), from a one in five stratified random sample of public colleges and universities (80 percent response rate). This gives us detailed information on the characteristics of students receiving aid from 35 different programs during academic year 1983-84 (see Stampen, 1985a, for further details). This source is well suited to answer questions about the targeting and packaging of aid within the student aid system. We supplement it with data on nonaided students from four state-based student surveys of resources and expenditures (i.e., Arizona, California, New York, and Wisconsin). Statistical sampling and other technical specifications are described in Erbschloe and Fenske (1984), Hills and Van Dusen (1984), Cross (1983), and Stampen (1983b).

The longitudinal data base is built from the records of the University of Wisconsin System, which includes 14 public universities in the state. From this source we drew a 20 percent random sample of the beginning freshman class of 1979. This sample, which includes fall semester data on both aided and nonaided students, allows us to reliably track aid utilization among students over the first three years of undergraduate education. (For technical specifications see Stampen, 1985b. Appendix Table C compares aid recipient characteristics for the two data bases.)

Income Categories. We employ four after tax income categories for households generated by the U.S. Bureau of the Census and the Applied Systems Institute to compare income distributions for the public college students, divided into family dependent and independent categories. (Table 1 shows these distributions and compares them with estimates for all full-time dependent students and for the U.S. population.)

Student Aid Categories. There are essentially three ways for students to qualify for aid. Most common is to demonstrate financial need via either the Pell or Uniform Methodology needs analysis system. These systems are similar by requiring full disclosure of income and other assets and by awarding aid under approximately equally stringent formulas. Next most common is qualifying for aid under the GSL needs analysis system. This system is far less stringent because students qualify for maximum loans as long as either their or their parents' combined adjusted income is less than $30,000. However, students from families earning more than $30,000 are required to demonstrate need according to standards similar to ones found in the Uniform Methodology system. The third approach is to qualify for aid under a non income-based categorical requirement, such as academic merit, veteran status, or employee benefits.

To reflect these three approaches, we constructed the following categories:

Need 1 includes students who receive aid from at least one federal, state, or institutional program governed by either the Pell or Uniform Methodology needs analysis systems. This includes Pell grants, Supplemental Educational Opportunity Grants (SEOG),[3] State Student Incentive Grant (SSIG), National Direct Student Loans (NDSL), College-Work Study (WS) as well as numerous smaller programs.

Need 2 includes students who qualify on the basis of receiving aid under the GSL needs analysis system, but who do not also receive aid from any program serving Need 1 recipients. In addition to the GSL program, this includes the Parent Loans for Undergraduate Students (PLUS) program and some state programs.

Nonneed includes students who qualify on the basis of receiving aid from at least one nonneed-based categorical program, but who do not also receive aid from any program serving either Need 1 or Need 2 recipients (e.g., merit scholarships, veterans benefits, social security education benefits before 1985, and employee benefits).

No Aid includes students who do not receive aid from any programs.

Note that all aid recipients are included in one or another of the above categories and the categories do not overlap. Thus this classification scheme provides an exhaustive grouping of students in the sample. (Table 2 shows the before-tax average parental incomes for full-time dependent students by aid category.)

Packaging Categories. In developing our packaging categories, we examined data from five federal programs (Pell, SEOG, NDSL, GSL, WS) and one largely state financed program (SSIG). These programs together served eight

Table 1

Percent Distribution of After-Tax Incomes:
Full-Time Dependent Students, U.S. Population, and Full-Time Dependent and Full-Time Independent Aid Recipients Attending Public Colleges, 1983, by Income Group

Population	Income			
	$0-10K	$10-20K	$20-30K	$30K+
All Full-Time Dependent Students[1]	9	15	18	58
US Population[2]	17	24	21	38
All Independent[3] Aid Recipients	80	16	4	0
All Dependent[3] Aid Recipients	24	33	26	17[a]

Source: [1] Applied Systems Institute, unpublished data, 1985.

[2] U.S. Commerce Department, Bureau of the Census, After-Tax Money Income Estimates for Households, 1983.

[3] Public Higher Education Student Aid Recipient Data Base: 1983-84 (includes recipients of all combinations of Pell, SEOG, SSIG, NDSL, GSL and CWS - Stampen 1986b).

[a] When students receiving loans and/or nonneed-based grants are excluded, the percentage in the $30,000 or above category is reduced to 10 and the percentage in the lower income categories correspondingly increased.

out of ten aid recipients and accounted for seven of ten student aid dollars in public colleges and universities during academic year 1983-84.

Our national data base enables us to identify all combinations of these programs. Sixty-three combinations emerged (see Appendix Table B) and were collapsed into seven mutually exclusive categories: grants only, loans only, work-study only, grants and loans, grants and work-study, loans and work-study, and all three). These patterns are then compared to show how percentages of aid recipients vary by income group. (See Figure 1 and Table 3).

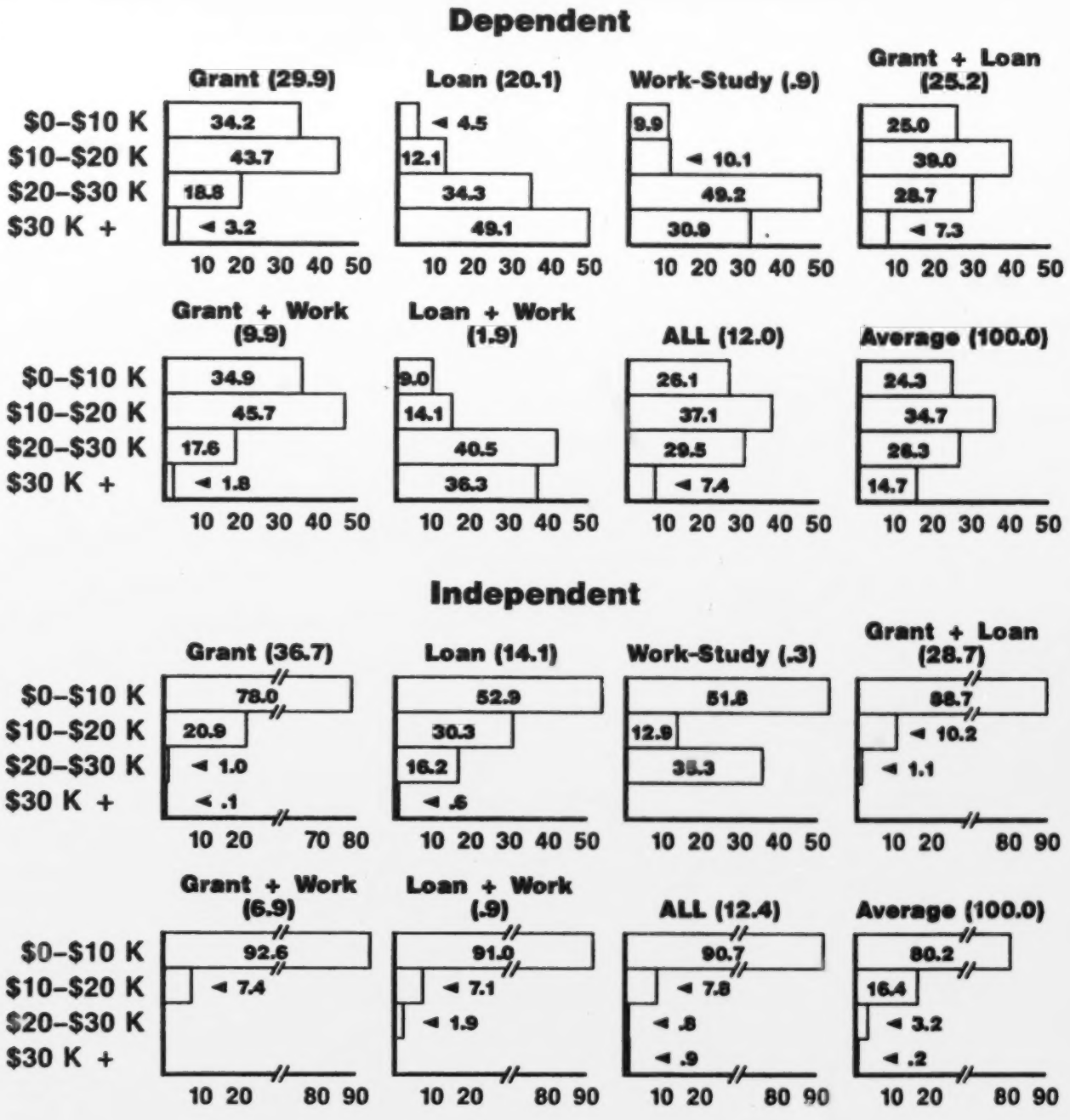
To explore aid utilization and its association with attrition we applied the Markov Transition Probability Analysis technique to our longitudinal data base. This technique has previously been used in studies of occupational mobility (Bishop, Feinberg and Holland, 1975) and employment processes (Heneman and Sandver, 1976). This is the first time it has been used to analyze student aid. The technique allows us to summarize via probability estimates student movements among categories.

The Targeting of Student Aid

There is considerable evidence that most need-based aid is targeted on students from low income families. Students receiving aid from one or more of the nations' six largest student aid programs come predominantly from the lowest income strata of the college-going population and the population in general. This is demonstrated in Table 1. The distribution of after-tax family incomes for all full-time dependent students (top row) indicates that more than half of them come from families with annual incomes of $30,000 or above and only 9 percent from families with incomes of $10,000 or below. For the U.S. population as a whole, 38 percent of families have incomes of $30,000 or above and 17 percent have incomes of $10,000 or below. For independent aid

Figure 1

Distribution of Need-Based Financial Aid
by Type of Aid, Income Group, and Dependency Status



Source: Public Higher Education Student Aid Recipient Data Base: 1983-84, includes recipients of Pell, SEOG, SSIG, NDSL, GSL, and CWS (Stampen, 1985b)

recipients attending public institutions, the great majority have annual incomes of $10,000 or below. This is because their incomes by definition include only their own earnings.[4] The distribution of dependent aid recipients indicates a majority (57 percent) have family incomes below $20,000 a year. When recipients of nonneed-based grants and loans are removed from the distribution, the proportions from families with income below $20,000 increases substantially.

Further information on income differences among the four student aid categories is provided in Table 2. For all five data bases shown, dependent Need 1 recipients have sharply lower average incomes than other groups. The differences among Need 2, Nonneed and No Aid students are minor by comparison. Although the absolute income levels vary across the different columns, the ratio of incomes between Need 1 recipients and other categories of aid recipients (Need 2 and Nonneed) remains relatively constant at about two-thirds. The ratio between Need 1 and students not receiving aid (No Aid) is about half.[5] The average incomes of Need 2 and Nonaided students are much more similar, in part because of the inclusion of nonneed-based aid, in part because the need-based requirements for loans are less stringent than for need-based grants, but possibly also in part because student aid officers direct loans toward the higher income aid recipients. We shall return to this point below.

Figure 1 shows our seven aid packaging categories by after-tax family family income level for dependent and independent students, plus the overall average. Clearly packaging of aid is the rule rather than the exception. Sixty percent of the dependent aid recipients received aid from more than one of the six programs included in our analysis. When we confine attention to Need 1 recipients, the percentage jumps to 78 percent.[6]

Table 2

Average Parental Income for Full-Time Dependent Undergraduates
Attending Public Colleges and Universities
by Aid Recipient Classification
(before-tax incomes)

Aid Recipient Classification	Population					
	U.S.[1] (all public)	Arizona[2] (all public)	California[3] (all public)	New York[4] (CUNY)	New York[4] (SUNY)	Wisconsin[5] (UW-Madison)
Need 1	$16,037	$12,800	$20,300	$17,400	$11,300	$21,600
Need 2	$23,260	19,600	30,000	33,700	27,300	27,000
Non Need	$23,065	20,800	30,000	25,600	23,300	39,000
No Aid	No Data	29,200	40,000	30,700	29,700	39,000

1. All Public Higher Education, 1983-84, includes 2-year and 4-year institutions (Stampen, 1985b)
2. Arizona, 1983-84, includes 2-year and 4-year institutions (Exbscholoe and Fenske, 1984)
3. Calfiornia, 1982-83, includes 2-year and 4-year institutions (Hills and Van Dusen, 1982)
4. New York, 1983, includes 2-year and 4-year institutions (Cross, 1983)
5. Wisconsin, 1983-84, includes University of Wisconsin-Madison only (Stampen, 1983b)

It is also clear that the pattern postulated above--that packages would be more likely to include loans or work-related funds as family income rises--does indeed characterize the aid picture. First, consider dependent students. The packages containing grants go predominantly to the two bottom family income brackets. (The fact that the larger group is typically the $10,000-$20,000 bracket is due to the small absolute numbers of students in the lowest category.) The distribution pattern for loans alone, loans combined with work, and work alone provides a sharp contrast, with the great majority in the top two family income brackets.

For independent students, the percentages with aid generally drop sharply as income increases for all packages. This simply reflects the fact that 80 percent of independent students are in the lowest income category. Within this general pattern, however, differences can be seen. The categories that include grants have 80 to 90 percent of recipients in the lowest bracket. Loans alone and work-study alone have just over half.

The overall packaging of student aid thus reflects remarkably well the recommendations and guidelines based on an earlier research. Grants alone or in combination with other forms of aid flow primarily to lower income and recipients, as does the bulk of work-study assistance. Loans go to higher income students, indeed, aid recipients in the $30,000 or over (after-tax) income category rarely receive any type of aid except loans.

A final dimension of packaging is the level of the dollar awards. To what extent do total award dollars vary from one form or combination of aid to another? Table 3 shows the size of the average packages by family income level for dependent and independent students.

Two aspects of the table demand particular attention. The first is variation across categories of aid. Grants and work-study awards are substantially smaller than other forms and combinations of aid. Why this is

Table 3

Average Aid by Type of Need-Based Aid,
Income Group, and Dependency Status
(Dollars in Thousands)

After-Tax Income	Grant	Loan	Work-Study	Grant-Loan	Grant-Work	Loan-Work	All	Average Aid	% of Aid Dollars	% of Aid Recipients
				Dependent						
$0-$10K	$1.6	$2.3	$1.9	$3.4	$2.7	$2.5	$3.9	$2.6	24.9	23.5
$10-$20K	1.5	2.3	1.3	3.3	2.6	2.5	4.3	2.6	35.8	33.7
$20-$30K	1.3	2.3	1.4	2.9	2.5	3.0	3.8	2.5	26.2	26.5
$30K+	1.5	2.0	1.4	2.8	2.2	2.7	4.0	2.2	13.1	16.3
				Independent						
$0-$10K	1.3	2.3	1.6	3.6	3.0	3.3	4.8	2.8	83.2	79.5
$10-$20K	1.0	2.8	-	3.4	4.4	-	4.3	2.3	15.0	16.8
$20-$30K	.6	2.1	-	3.0	-	1.8	-	2.2	2.6	2.3
$30K+	-	1.7	-	-	-	-	3.2	2.1	.2	.4

Source: Public Higher Education Student Aid Recipient Data Base: 1983-84, includes recipients of Pell, SEOG, SSIG, NDSL, GSL, and CWS (Stampen, 1985b)

so is not entirely clear. In the case of grants, part of the explanation is that the mix of recipients leans toward low tuition institutions (not shown), thus implying lower levels of need. Also (as shown in Figure 1), work-study alone is distributed mainly to students in the higher income categories, again suggesting that these recipients are less needy than students receiving multiple forms of aid.

Recipients of all three types of aid and the specific combination of grants and loans yield the largest average awards. This might appear inconsistent with the targeting evidence provided by Figure 1. However, it is not necessarily so when we remember that the likelihood of receiving multiple packages declines as income rises.

The Relationship Between Aid Categories and Attrition

As noted in our data and methodology section, we examine the relationship between aid and aid package categories and attrition by following a sample of 1979 University of Wisconsin System freshmen from the fall of 1979 through the fall of 1982. A limitation of our analysis is that the data pertain to students in only one university system. It is a large system, however, with an entering undergraduate class of about 25,000 students attending several universities varying in size, urban-rural environment, and entrance requirements across the state. The strengths of the data are the great detail, the inclusion of nonaided students, and the ability to follow particular students through time.

To put our analysis into context, let us first look at changes in the distribution of students in the various categories over the period of observation (Table 4). As can be seen, in all years, the majority of students did not receive financial aid. The proportion not receiving aid did go down

Table 4

Enrollment Change by Aid Recipient Classification:
University of Wisconsin System
(Fall 1979 - Fall 1982)

Aid Recipient Classification	Enrollment Charge							
	1979		1980		1981		1982	
	N	%	N	%	N	%	N	%
Need 1	1107	22.2	949	26.0	793	25.3	732	24.9
Need 2	253	5.1	275	7.5	402	12.9	360	12.3
Nonneed	301	6.0	170	4.7	197	6.3	204	6.9
No Aid	3319	66.7	2254	61.8	1736	55.5	1645	55.9
Total	4980	100.0	3648	100.0	3128	100.0	2941	100.0

Source: State Longitudinal Data Base: 1979-82 (Stampen, 1985c)

over the period, however, from 66.7 percent in their freshmen year to 55.5 percent in their fourth year.

Within the decline in the total number of students in our longitudinal file (due to attrition), we see interesting divergencies among categories. The number of nonaided students declines the most, by one-half; Need 1 and Nonneed recipients decline by roughly one-third; Need 2 recipients, on the other hand, increase a little between years 1 and 2 and substantially between years 2 and 3, before declining slightly in year 4. The Markov Analysis, Figure 2, shows the average annual probabilities of students moving from one aid category to another or dropping out during their four years of college. The rows represent categories students belong to in an initial year. Cells along the main diagonal indicate the probability of remaining within the same category the following year and off diagonal cells indicate the probability of moving to any given category the following year. All movements during the period 1979 to 1982 are included.

Since students' economic circumstances are in most instances likely to remain stable, it is not surprising to find the largest probabilities along the diagonal. Thus, 61 percent of students classified as Need 1 recipients in one year retain the same classification the following year. Sixty-eight percent of nonaided students in one year remain nonaided the next. The Need 2 and nonneed-based aid categories are more volatile. Between 50 and 60 percent move from year to year. Students in the Need 2 group are more likely to lose aid than to move to another category or drop out. This reflects the fact that students in this category mainly receive GSL loans, which are awarded basis of need according to less stringent income criteria than for Need 1 recipients. The students in the nonneed-based aid category are more likely to move to the Need 1 category than to other categories or to drop out. This may reflect the fact that awards that are not explicitly based on need

Figure 2

Markov Analysis Results:
Average Annual Transition Probability Matrix for
Four Categories of Students:
University of Wisconsin System

(Fall 1979 - Fall 1982)

t	t + 1				
	Need 1	Need 2	Nonneed	No Aid	Dropout
Need 1	.614	.038	.067	.085	.196
Need 2	.137	.403	.026	.256	.178
Nonneed	.282	.029	.440	.107	.142
No Aid	.045	.066	.011	.687	.191

Source: State Longitudinal Data Base: 1979-82 (Stampen, 1985c)

are often awarded to the lower income students nevertheless (Appendix Table A shows that the preponderance of all financial aid goes to those in the Need 1 category). It may also reflect the phase out of social security education benefits in the early 1980s. These were not means-tested, but a large percentage of their recipients were from low-income families (Congressional Budget Office, 1977.)

Since the ultimate objective of this part of the analysis is to examine the relationship between student financial aid and the likelihood of dropping out, the last column of Figure 2 is the most important. Here we see the association between student aid and attrition as expressed by transition probabilities (i.e., rates of historical movement). Need 1 students (those with the lowest incomes) had an average annual dropout rate of 19.6 percent. This is almost identical to the dropout rate for students receiving no aid, which was 19.1 percent. Thus, attrition rates for low-income versus high-income students no longer differ, as was apparently the case before student aid (Sewell and Shah, 1967). If we take as our standard the dropout rate of the nonaid group--which is the group with the highest average family income (as we saw earlier)--to the extent that family income is a proxy for other advantages, we can read this result as at least suggesting that student aid has reduced the dropout rate of the low-income students. The lowest dropout rate is for students receiving nonneed-based aid--an expected result given that this group includes most students receiving aid on the basis of academic merit.

Let us now look at how student aid packaging is related to dropout rates. Once again we begin by providing the context of the packaging experience of our 1979 freshman sample over their four college years. The distribution over time of students receiving various forms and combinations of aid is shown in Table 5. The previously noted pattern of placing increased reliance on loans

Table 5

Enrollment Change by Type of Need-Based Aid Received:
University of Wisconsin System

(Fall 1979 - Fall 1982)

Type of Aid	Enrollment Change							
	1979		1980		1981		1982	
	N	%	N	%	N	%	N	%
Grant	390	7.8	309	8.4	209	6.6	132	4.4
Loan	310	6.2	304	8.3	454	14.2	401	13.5
Work-Study	32	.7	20	.5	23	.7	7	.2
Grant + Loan	548	11.0	417	11.3	451	14.1	478	16.1
Grant + Work-Study	180	3.6	200	5.4	88	2.8	71	2.4
Loan + Work-Study	34	.7	31	.8	28	.9	32	1.1
All	167	3.4	153	4.2	200	6.3	208	7.0
No Aid	3319	66.6	2254	61.1	1736	54.4	1645	55.3
Total	4980	100.0	3688	100.0	3189	100.0	2954	100.0

Source: State Longitudinal Data Base: 1979-82 (Stampen, 1985c)

as students progress through college recurs. Reliance on aid involving loans increases while reliance on nonrepayable forms of aid decreases. As before the majority (although a declining one) are nonaided students. The most frequent category of aid in all but the third year is grants combined with loans.

The annual movements of students from one aid category to another are shown in Figure 3. The structure is the same as that of Figure 1. This gives us a more refined picture of attrition rates, because the student aid categories include aid packaging.

The nonaided group is, of course, identical in this figure and the previous one. They are the most stable group, with 68.7 percent remaining in the same category from one year to the next. The next most stable group is made up of those receiving a combination of grants and loans. Nearly half of them remain in the same category between one year and the next. This is not surprising since grants and loans account for more than eight out of ten student aid dollars. The somewhat over 50 percent who move are more likely to move to another aid category than to drop out; but they are also more likely to drop out than to continue without funds. The next most stable category includes those receiving loans only; 39.2 percent of them remain from one year to the next. The ones that move are more likely to go to the no aid category than to any other aid category, but slightly more likely to join some other aid category than to drop out. The other categories are very volatile, with more moving to another aid category than dropping out, but more dropping out than continuing without aid.

As before, since our primary interest is in attrition, the last column is the most important--in particular when it is compared with the no aid column. We take as our benchmark, as we did before, the attrition rate of the nonaided student. For the years covered, this averaged 18.8 percent. Those

Figure 3

Markov Analysis Results:
Average Annual Transition Probability Matrix for Seven Aid Packages:
University of Wisconsin System

(Fall 1979 - Fall 1982)

t	t + 1								
	Grant	Loan	Work Study	Grant + Loan	Grant + Work-Study	Loan + Work-Study	ALL	No Aid	Dropout
Grant	.204	.128	.005	.198	.039	.010	.037	.189	.190
Loan	.036	.392	.005	.100	.006	.018	.023	.248	.172
Work Study	.081	.073	.166	.081	.162	.037	.052	.232	.116
Grant + Loan	.081	.059	.003	.466	.032	.012	.105	.074	.168
Grant + Work-Study	.136	.025	.005	.147	.261	.020	.188	.077	.141
Loan + Work-Study	.040	.098	.022	.146	.064	.115	.231	.185	.099
ALL	.037	.021	.002	.242	.129	.020	.364	.041	.144
No Aid	.019	.071	.002	.020	.004	.003	.006	.687	.188

Source: State Longitudinal Data Base: 1979-82 (Stampen, 1985c)

receiving only grants had a very similar rate (19.0 percent). Since these are predominantly lower income students, our package analysis supports earlier evidence suggesting that the expansion of the student aid program has been accompanied by the narrowing to the point of eliminating the gap in attrition rates between lower income and higher income students. The grant-only attrition rate is almost identical to the rate at which grant-only recipients in one year continue without aid the next year, although this category mixes nonneed based grants such as academic scholarships and veterans benefits with need-based Pell, SEOG, and SSIG grants, thus making the grant-only category unreliable for predicting the attrition rates of Need 1 grant recipients. Other aid categories only include need-based aid recipients. Dropout rates for aid other than grants alone are similar or are lower. This is a finding that requires further discussion because it indicates that, at least for this population over this time period, loans do not increase the likelihood of attrition.

Recall that earlier research found loans to be less effective for low income students than other forms of aid. Our data indicate that loans by themselves do produce the third highest attrition rate, but the rate falls as loans are combined with grants and work-study. This, however, does not necessarily refute earlier findings regarding loans made by Astin (1975) and others. Neither does it necessarily support the findings by Vorhees (1985). As Figure 1 shows, recipients of loans are among the highest income students receiving aid. This is true within the state as well as the national data bases. Since Vorhees did not control for the possibility that the student aid system, following earlier criticisms of loans, avoids giving loans to the lowest income students, his conclusions must be viewed with caution. Our data are consistent with the possibility that increasing the targeting of loans to the lowest income students would increase attrition rates.

The most interesting pattern emerging from the second Markov Analysis is the low attrition rates associated with-work study, either alone or in combination with any other form of aid. Tinto's theory on attrition, even though it ignores financial variables, may explain why. If, as his theory argues, students drop out when their sense of integration with a college or university is low, it is easy to imagine how the lack of adequate financial resources could undermine their sense of integration and erode their academic performance, motivation, and relationships with others on campus. Following this logic we regard the following as a plausible explanation. Work-study, while alleviating financial problems, also increases the student's sense of belonging within the institution by establishing working relationships with faculty and other students. It is perfectly possible that grants and loans are less effective than work-study awards in performing the task of integration, since neither increases contact with the institution.

Before jumping to the conclusion that work-study is the most effective form of student aid, however, readers are cautioned that these results are as yet uncontrolled for variations in student characteristics. In other words, we cannot exclude the possibility that some other factor affects <u>both</u> the work: study awards and attrition rates. For example, work-study recipients are in some instances given a choice of whether to receive a loan or a job. This choice may bias the results by self-selecting the most motivated into the job category. The extent to which work-study recipients are self selected is currently being explored.[7] In a separate study, the authors are testing the results of the Markov analyses by controlling for age, sex, ethnic background, ability, and, to some extent, income.

Conclusions, Limitations, and Suggestions for the Future

What do we conclude from this exploratory study. Overall, the student aid system provides tangible benefits to its recipients and society. There is abundant evidence that the targeting and packaging of need-based aid is characterized by distribution patterns similar to those recommended by policy guidelines and previous research and thgese seem to be reinforced by our findings. Moreover, need-based aid recipients of the Need 1 variety (who account for roughly three out of four aid recipients nationally) do in fact differ from other students because of their more limited financial resources. Aid packages seem appropriately targeted. Finally, recipients of aid who tend to be the least economically advantaged do not have higher attrition rates than the more affluent students who do not receive aid.

All this seems very reasonable. However, finding evidence of positive effects is not the same as saying that the existing system is optimally equitable and effective. We need clearer standards for judging. We have taken a first step here by establishing verifiable categories of aid recipients and programs and we have documented the flows of various types of financial aid to these recipients. Further work is needed to identify and develop appropriate indicators of success. In parallel with this effort, we also need to know more about the extent of misdirection or abuse in student aid. Misqualification is widely perceived as a problem, but no one has yet shown the extent to which students qualify for aid either improperly or because of loopholes in the system. Finding the answer is important because misdirection and abuse often does more to affect the future of public programs than do their quiet successes.

We could learn much more about all of these matters if more and better data were available. We have demonstrated that much new information about the workings of the student aid system can be generated from either new or previously underutilized sources such as the student aid recipient data bases, the state resource and expenditure surveys, and longitudinal data bases under development in many university systems. These data bases, while never ideal for purposes of research, nevertheless offer excellent opportunities to explore both new and old questions.

Notes

1. There is a third standard for nonneed-based aid in the form of scholarships: That the aid induce the most talented, best achieving students, irrespective of income status to continue their education and to choose the awarding institution. The present paper does not address effectiveness from this perspective.

2. Current guidelines evolved from the Higher Education Amendments of 1972 which provided a "floor" of assistance in the form of federally financed grants for needy undergraduate students and allowed loans and work-study assistance defined as "self-help" to fill remaining gaps between personal resources and college attendance costs.

3. In this study SSIG refers to all state grants. This is somewhat confusing since the federal SSIG program, although it assists virtually all state funded grant programs, provides only a small fraction of state grant dollars. Nevertheless we use the SSIG acronym to represent the relationship between state grant programs and the federal government.

4. More than half of all independent aid recipients attending public colleges (59 percent) were age 25 and older in 1983-84 as compared to four percent of dependent students (Stampen, 1985a, p. 31). Also, roughly 4 out of 10 independent students were either married with or without children, or single with dependents of their own (Stampen, 1983a).

5. State data also suggest that income may be one of only a few differences between aided and nonaided students. With respect to academic performance, for example, California data show grade-point averages to be the same across all student categories and Wisconsin data show similar levels of academic performance in high school. Also, four states show similar percentages of students, working to support college attendance (Stampen, 1985).

6. The great variety of different aid packages for Need 1 recipients is shown in Appendix Table B. When we include all aid programs (i.e., beyond the six programs employed in our analysis), we see that the majority of aid in almost every program flows to Need 1 recipients, thus indicating the broad reach of aid packaging (See Appendix Table A).

7. Regarding the results of the Markov Analysis of aid packages, some distortion might result from the small number of cases in the work-study only and the loan and work-study categories. Other limitations in data used in this study include the following: Figures in the Public Higher Education data base (Stampen, 1985b) overstate average incomes due to the elimination of aid recipients reporting zero incomes. (This flaw is in the process of being corrected.) GSL recipients are also somewhat underrepresented

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Table A

Dependent Aid Recipients Attending Public Colleges and Universities, 1983-84

Average Awards By Type of Aid Recipients

	Need 1 (N=1,216,551)			Need 2 (N=243,217)			Nonneed (N=115,696)		
	Mean	N	%	Mean	N	%	Mean	N	%
Institutional									
Nonneed Schol.	656	66,691	58	706	8,390	7	665	40,443	35
Need Grants	680	75,680	100	---	---	--	----	---	--
Non-CWSP Earn.	1039	46,217	73	1,517	3,968	6	1,680	13,012	21
Fellowships	807	952	47	6,672	476	24	534	597	29
Assistantships	1349	1,875	59	---	---	--	1,308	1,284	41
Long Term Loans	1542	4,132	77	230	199	3	695	689	20
Employee Benefits	729	1,466	71	---	---	--	666	589	29
Benefits-Depend.	1146	1,443	59	728	454	18	78	562	23
Other Institution	766	18,603	71	1,380	3,173	12	1,227	4,391	17
Federal									
Pell Grants	945	970,900	100	---	----	--	---	---	--
SEOG	529	290,005	100	---	----	--	---	---	--
NDSL	768	370,096	100	---	----	--	---	---	--
CWSP	1040	356,929	100	---	----	--	---	---	--
FISL/GSL	1891	352,208	60	1,999	237,741	40	---	---	--
PLUS	1821	3,816	24	2,401	11,910	76	---	---	--
ALAS	2020	806	78	2,720	218	22	---	---	--
Social Security	1572	13,169	87	1,295	1,527	10	1,140	457	3
Health Grant	1000	270	100	---	----	--	---	---	--
Health Loans	1819	6,713	100	---	----	--	---	---	--
Nursing Grant	1000	270	100	---	----	--	---	---	--
Nursing Loans	725	4,801	100	---	----	--	---	---	--
Other Federal	1323	10,355	62	958	1,334	8	2,112	5,102	30
State									
Merit Grants	495	32,075	73	503	3,688	8	506	8,116	19
SSIG	588	446,882	100	---	---	--	---	---	--
Entitlement	777	32,105	83	549	3,876	10	708	2,745	7
Campus Based	721	13,479	97	---	---	--	386	457	3
State CWS	1057	8,919	74	1,290	294	2	1,330	2,895	24
Rehab. Grant	739	8,093	69	326	226	2	825	3,401	29
Other State	614	43,993	85	512	2,479	5	1,167	5,384	10
Other									
Scholarships	716	64,881	75	866	4,986	6	1,051	17,072	20
Loans	1535	2,395	84	---	---	--	1,090	457	16
Earnings	1824	19,328	91	2,782	1,479	7	646	402	2

Source: Public Higher Education Student Aid Recipient Data Base 1983-84 (Stampen, 1985b)

Table B

Aid Packages of Dependent Need-Based Aid Recipients Attending
Public Colleges and Universities: 1983-84
Percent Accounted for by Individual Aid Packages
(Includes Need 1 and Need 2 Recipients)

Package	%	Package	%	Package	%
1. SSIG only	2.1	22. SEOG, CWS, SSIG	.1	43. Pell, NDSL, GSL, SSIG	1.1
2. GSL only	17.6	23. SEOG, CWS, GSL	.3	44. Pell, NDSL, CWS	1.0
3. CWS only	1.0	24. SEOG, CWS, GSL, SSIG	.0	45. Pell, NDSL, CSW, SSIG	.8
4. NDSL only	2.4	25. SEOG, NDSL	.7	46. Pell, NDSL, CWS, GSL	.4
5. SEOG only	.3	26. SEOG, NDSL, SSIG	.2	47. Pell, NDSL, CWS, GSL, SSIG	.5
6. Pell only	16.6	27. SEOG, NDSL, GSL	.7	48. Pell, SEOG	1.3
7. GSL, SSIG	1.5	28. SEOG, NDSL, GSL, SSIG	.1	49. Pell, SEOG, SSIG	1.2
8. CWS, SSIG	.2	29. SEOG, NDSL, CWS	.6	50. Pell, SEOG, GSL	.4
9. CWS, GSL	.6	30. SEOG, NDSL, CWS, SSIG	.1	51. Pell, SEOG, GSL, SSIG	.4
10. CWS, GSL, SSIG	.2	31. SEOG, NDSL, CWS, GSL	.5	52. Pell, SEOG, CWS	1.9
11. NDSL, SSIG	.6	32. SEOG, NDSL, CWS, GSL, SSIG	.1	53. Pell, SEOG, CWS, SSIG	.8
12. NDSL, GSL	1.1	33. Pell, SSIG	7.8	54. Pell, SEOG, CWS, GSL	.5
13. NDSL, GSL, SSIG	.4	34. Pell, GSL	6.1	55. Pell, SEOG, CWS, GSL, SSIG	.3
14. NDSL, CWS	.9	35. Pell, GSL, SSIG	3.3	56. Pell, SEOG, NDSL	1.5
15. NDSL, CWS, SSIG	.3	36. Pell, CWS	4.1	57. Pell, SEOG, NDSL, SSIG	1.5
16. NDSL, CWS, GSL	.5	37. Pell, CWS, SSIG	2.0	58. Pell, SEOG, NDSL, GSL	.4
17. NDSL, CWS, GSL, SSIG	.3	38. Pell, CWS, GSL	1.1	59. Pell, SEOG, NDSL, GSL, SSIG	.4
18. SEOG, SSIG	.2	39. Pell, CWS, GSL, SSIG	.7	60. Pell, SEOG, NDSL, CWS	2.0
19. SEOG, GSL	.2	40. Pell, NDSL	2.5	61. Pell, SEOG, NDSL, CWS, SSIG	1.2
20. SEOG, GSL, SSIG	.1	41. Pell, NDSL, SSIG	1.7	62. Pell, SEOG, NDSL, CWS, GSL	.7
21. SEOG, CWS	.5	42. Pell, NDSL, GSL	.8	63. All	.2
				Total	100.0
				N	1,247,916

Source: Public Higher Education Student Aid Recipient Data Base (Stampen, 1985b)

Table C

Aid Recipient Characteristics: The Public Higher Education and University of Wisconsin System Data Bases Compared

Characteristics	Nation 2-year + 4-year institutions	State 4-year only institutions
Student Classification	%	%
Need 1	22.2	24.4
Need 2	4.1	8.8
Non Need	3.0	5.9
No Aid	70.7	60.9
Average Income	1983-84	1982-83
Need 1	$16,037	$17,245
Need 2	23,260	25,707
Non Need	23,065	17,643
No Aid	No Data	No Data
Aid Packages	%	%
Grant	32.6	17.7
Loan	17.7	25.0
Work-Study	.7	1.4
Grant & Loan	26.6	32.2
Grant & Work-Study	8.7	9.2
Loan & Work-Study	1.5	2.1
All	12.2	12.4

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